

WHAT IS CLAIMED IS:

1. A method for conveying a product, comprising:
providing a conveyor having a plurality of roller shafts, each roller shaft
5 having a plurality of driven, rotating rollers;
supporting the product by the rollers;
lifting the product by rotating the rollers; and
conveying the product during said lifting by rotating the rollers.

- 10 2. The method of claim 1 wherein each roller has a non-circular shape
and which further comprises:
interlocking adjacent rollers; and
establishing a predetermined angular offset between adjacent rollers by said
interlocking.

- 15 3. The method of claim 1 wherein said providing includes a static
member and which further comprises:
spacing apart adjacent rollers on the same shaft by a predetermined width;
supporting the product within the predetermined width by the static
20 member; and
sliding the product along the static member during said conveying.

4. The method of claim 1 which further comprises:
biasing together the rollers of a shaft by a spring.

- 25 5. The method of claim 1 wherein the rollers each have a plurality of
lobes about their outer surface, and said lifting is by the lobes.

6. The method of claim 1 wherein the rollers each have a plurality of
30 lobes about their outer surface, and said conveying is by the lobes.

7. The method of claim 1 wherein the driven rollers are slippable rollers.

5 8. An apparatus for conveying a product, comprising:
a plurality of roller shafts;
a plurality of driven rollers supported by each said roller shaft, each said
roller having an outer surface and a plurality of lobes placed circumferentially
around the outer surface, and
10 a static member having a top surface and a length extending from between
a first pair of said rollers of a first said shaft to between a second pair of said
rollers of a second said shaft;
wherein said lobes support the product at a first vertical height, and the top
surface of the static member is adapted and configured to support a portion of the
15 product between a pair of said rollers at a second vertical height different than the
first vertical height.

9. The apparatus of claim 8 wherein said rollers are slippable rollers
slippably driven by the outer diameter of the corresponding said shaft.

20 10. The apparatus of claim 8 wherein the first vertical height is greater
than the second vertical height and the difference between the first vertical height
and the second vertical height is more than about one half of a millimeter and less
than about two millimeters.

25 11. The apparatus of claim 8 wherein the first vertical height is greater
than the second vertical height and the difference between the first vertical height
and the second vertical height is more than about one half of a millimeter and less
than about one and one-half millimeters.

12. The apparatus of claim 8 wherein said static member has a width and the width is greater than about one half of a millimeter and less than about two millimeters.

5 13. The apparatus of claim 8 wherein said static member is supported by a plurality of said roller shafts.

10 14. The apparatus of claim 13 wherein said static member includes a plurality of slots, each slot adapted and configured for receiving therein a different one of a corresponding plurality of said roller shafts, said corresponding shafts supporting said static member at said slots.

15 15. The apparatus of claim 8 which further comprises means for interlocking adjacent driven rollers, such that the lobes of one adjacent roller have a predetermined angular relationship to the lobes of the other adjacent roller.

16. The apparatus of claim 15 wherein said interlocking means establishes a single predetermined angular relationship between all the lobes of one adjacent roller to all the lobes of the other adjacent roller.

20 17. The apparatus of claim 15 wherein said first pair of rollers are not interlocked together and the second pair of rollers are not interlocked together.

18. The apparatus of claim 8 wherein the product is a paper product.

25 19. The apparatus of claim 8 wherein the product is a stack of paper products.

20. An apparatus for conveying a product, comprising:
a roller shaft having a smooth outer diameter; and
a plurality of rollers rotatably supported by said roller shaft, each said roller
having an outer surface and a plurality of lobes placed circumferentially around the
outer surface, each said roller having an inner diameter adapted and configured for
5 being slippably driven by said shaft.

21. The apparatus of claim 20 which further comprises means for
coupling together said plurality of rollers such that said rollers rotate in unison.

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22. The apparatus of claim 20 which further comprises a spring for
biasing said rollers toward each other.

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23. An apparatus for conveying a product, comprising:
a roller shaft having an outer diameter; and
a plurality of rollers supported by the outer diameter of said roller shaft,
each said roller having an outer surface and a plurality of equally-spaced lobes
placed circumferentially around the outer surface,
wherein adjacent said rollers are in fixed relationship to each other such
20 that there is a predetermined angular offset from a lobe of one said roller to a lobe
of the adjacent said roller and the angular offset is more than about 14 degrees and
less than about 56 degrees.

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24. The apparatus of claim 23 wherein the angular offset is more than
25 about 21 degrees and less than about 37 degrees.

25. The apparatus of claim 23 wherein the angular offset is more than
about 24 degrees and less than about 32 degrees.

26. The apparatus of claim 23 wherein at least one side of each said roller includes a plurality of equally-spaced interlockable members, and the number of interlockable members is equal to the number of lobes.

5 27. The apparatus of claim 26 wherein said shaft includes at least two adjacent rollers which are in fixed relationship to each other by interlocking of the interlockable members of one said adjacent roller to the interlockable members of the other said adjacent roller.

10 28. A roller for a conveyor, comprising:
a body having an inner diameter adapted and configured for being supported by a shaft and a non-circular outer diameter adapted and configured for conveying a product, said outer diameter including at least two lobes and less than nine lobes, said body including a side having an interlocking member for coupling
15 to the interlocking member of a second adjacent said roller.

29. The roller of claim 28 wherein said interlocking member includes a plurality of interlockable male and female features, the male feature of one said roller being receivable in the female feature of a second adjacent said roller.

20 30. The roller of claim 29 wherein there is a first number of lobes, a second number of interlocking members, and the first number is the same as the second number.

25 31. The roller of claim 29 wherein said lobes are equally spaced about the outer diameter and said interlocking members are equally spaced about the side.

32. The roller of claim 28 wherein said lobes are star-shaped.

33. The roller of claim 28 wherein each said body has a centerline, a portion of each said lobe is the portion of said lobe furthest from the centerline,
5 and the portion defines a cusp.

34. The roller of claim 28 wherein the inner diameter is adapted and configured to be slippable about the shaft.

10 35. The roller of claim 28 wherein the outer diameter includes at least three lobes and less than seven lobes

36. The roller of claim 28 wherein the outer diameter includes at least four lobes and less than six lobes

15 37. A method for conveying a product, comprising:
providing a conveyor having a plurality of translatable roller shafts, each roller shaft supporting a plurality of rotatable rollers, the rollers being slippable on the corresponding shaft;
20 supporting the product by the rollers;
conveying the product by translating the roller shafts which support the rollers;
stopping the product;
translating the roller shafts under the product during said stopping;
25 rotating the rollers under the product during said translating; and
alternately lifting and lowering a portion of the product by the rollers during said rotating.

30 38. The method of claim 37 wherein the rollers each have a plurality of lobes about their outer surface, and said lifting is by the lobes.

39. The method of claim 37 wherein said providing includes an actuatable product stop and said stopping is by actuating the product stop.